

growing in gardens and near the towns, and he does not describe many scrambles up into the distant mountains. But of the wild flowers to be found on the hillsides or up the torrent beds no better guide could be afforded than the beautiful series of coloured illustrations distributed throughout the text. It is possibly a pity that the figures are mostly printed with black outlines, and it might be thought preferable to have them printed on plates instead of mixed up with the letterpress. In addition to flowering plants, a number of the characteristic seaweeds have also been illustrated, and several charming little sketches of Riviera coast scenery, in the form of headings to the descriptions of the five different holidays spent by Prof. Strasburger on the Riviera, are a welcome addition. All these illustrations have been tastefully drawn and coloured by Fraülein Reusch.

G. H. BRYAN.

INTERNATIONAL PHYSICS.

Recueil d'Expériences élémentaires de Physique. By Henri Abraham. Part ii. Pp. xii+454. (Paris: Gauthier-Villars, 1904.) Price 6.25 francs.

WE have already reviewed the first part of this collection of physical experiments, which has been gathered together under the auspices of the French Physical Society. A large number of physicists from all over the world have participated in the collaboration by sending both descriptions of experiments and bibliographical references, and the editor's work has consisted in giving as much homogeneity as possible to the products of this multiple collaboration.

The present and concluding part embraces the subjects of acoustics, optics, electricity and magnetism. On the whole, the experiments in this part are of a more difficult and elaborate kind than those previously described. This is to some extent, no doubt, due to the nature of the subjects treated. General manipulation and mechanics required less reference to be made to complicated and expensive apparatus than the subjects considered here. As a consequence of this the private student who has no access to a properly equipped laboratory will find much greater difficulties in his way. He will still find a field for work in acoustics and light. With a few springs and wires a considerable amount may be done in sound; and, in the experiments on light, homely articles like pins and champagne bottles are freely made use of. But in electricity and magnetism he must be prepared for greater outlay in apparatus. We lay stress on this point, because in our previous reference we recommended the book strongly to the private student with a taste for practical mechanics.

The present part will be found of greatest utility to the schoolmaster eager for hints in the arrangement of class and lecture experiments. One special feature in the descriptions is that in most cases the dimensions of the apparatus which have been found to work well are given. This will certainly save a teacher a great deal of time, which otherwise he would need to spend in experimenting himself in order to discover the suitable size and shape of his apparatus. We do not hesitate to say, however, that time so spent is never lost, and if in the busy workaday world of the teacher some

means for saving of time is essential, it has its disadvantages.

It is usually only by the somewhat laborious method of trial and error that one learns the conditions necessary for success.

There does not seem to be much in the volume which is absolutely novel as regards style of experiment. The aim, obviously, has been to describe as simple experiments as possible illustrative of all the common laws of physics. This description is in all cases very brief. There is no introduction of theoretical considerations; nor is there any attempt to make the subject attractive to a general reader. A figure, a short account of the construction and mode of using the apparatus—that is all.

In some cases the suggestions are open to criticism in minor details. Thus, vibrating springs, which ought to be attached to a fairly solid support, are shown screwed to a slender skeleton wooden box. But in the main the suggestions seem excellent, and there are few teachers who will be able to learn nothing from them.

The diagrams are not always clear; nor are they such as to give the book an attractive appearance.

Briefly, the collection is meant for the teacher and not for the student. To the former it is commended, with the hope that he will be able to give life to these somewhat dry bones by instilling his own individuality into them.

LIGHT AND HEALTH.

The Effects of Tropical Light on White Men. By Major Charles E. Woodruff. Pp. vii+358. (London and New York: Rebman, Ltd., 1905.) Price 10s. 6d. net.

THE title of this book gives little idea of the enormous field traversed by the author, or of the amazing conclusions at which he has arrived. We understand that the work is intended for laymen as well as for medical readers, and particularly for Americans about to reside in the Philippines. No exception can be taken to the advice given by Dr. Woodruff in his concluding chapters. The necessity for opaque white clothing, and of sufficient protection to the head; the paramount importance of the siesta, and of avoidance of work and social functions in the middle of the day are recognised by Europeans living in the tropics. The suggestions as to the selection of suitable recruits for the army in the Philippines are admirable.

But it is impossible to accept many of Dr. Woodruff's deductions from the scientific observations which he so largely quotes. Even if we take it for granted that the "death-rate of a place is proportional to its sunshine and inversely proportional to its latitude, other factors being eliminated," does it follow that the death-rate is dependent upon the amount of light, and have the other climatic conditions, and especially the parasitic insect life, no influence? Dr. Woodruff would have us believe so. He informs us that light is like alcohol, tea, coffee, and other stimulants. In moderation, it is beneficial; in excess, it is harmful. "We can do without it, but our metabolism is too sluggish or defective if we do not get it." Excess of

light, we are told, produces first stimulation and then depression, neurasthenia and even loss of memory. To protect us from these terrible ills we require a skin so highly pigmented that the sun's rays cannot influence our delicate nervous organisation. The want of a sufficiency of pigment in the skin, Dr. Woodruff informs us, has played an important part in the history of the world. The decline and fall of the Roman Empire and the decay of Greece were, in his opinion, due to the fact that the military forces of these powers were largely recruited from the northern blonde races. These dominating blondes, bred under cloudy skies, were reduced to impotence because their skins were insufficiently pigmented to resist the baleful influence of the bright sun of the Mediterranean. Light, and not luxury, was responsible. It is not surprising to learn that the conduct of the schoolboys of New York is worse on a bright June day than on a cloudy day in winter, but we should have thought that the author's reminiscences of his own school days would have suggested that there were other more probable causes than the irritating effect of the chemical rays of light upon the schoolboy's nervous system.

It is difficult to criticise an author who, in considering the experimental work of Ferni, whose opinion differs from his own, says, "it seems certain that he has been misquoted, and that the fact is the reverse of what he is alleged to have said." It is surely usual in a scientific treatise to verify references, but here, as elsewhere, Dr. Woodruff appears to have been rather hurried.

While admiring the author's industry and his courage in advancing his contentions, we cannot but consider many of his conclusions unwarranted. With the remark that it is a pity that our slum babies cannot undergo such "torture," we cannot forbear quoting the following statement of Dr. Woodruff:—

"We moderns of the intelligent classes alone violate the mother's instinct to hide away in the dark with her baby, and we ruthlessly thrust it out into the sun's rays, actually strapping the poor little sufferers into their carriages and torturing them with the direct rays of the sun pouring down into their faces."

OUR BOOK SHELF.

Handbuch der Heidekultur. By Dr. P. Graebner. Pp. viii+296. (Leipzig: W. Engelmann, 1904.) Price 9s. net.

THE German word "heide," like the English "heath," is applied to very different types of vegetation. In the narrowest acceptance it signifies a district covered with dwarf shrubs where ling or heather predominates, and such a formation is not uncommonly associated with loose, sandy soil. But in north Germany "heide" implies a wood, usually a pine wood, and the same conception attaches to it in other parts of Germany, as, for instance, the Dresdener Heide. Heath is therefore not a formation according to the ecological use of the word, but is applied to land where certain physical conditions prevail, and covers not only stretches of open woodland, but also grass and other moors, and may even be extended to peats and bogs. One feature common to these different formations is the presence of humus, and this is included in the definition given by Ramann.

The suggestive views as to the formation of heaths

advanced by Dr. Graebner in 1901 have become widely known, and have received very general acceptance. Heaths or moors may develop on sands or under water, but in north Germany, at any rate, and not improbably in other countries, much of the heathland has taken the place of forests. Opinions differ as to the causes which have brought about the change. Borggreve and Krause have attributed the disappearance of forests to destruction by animals, but Graebner attaches more importance to continual draining of salts into the lower layers by percolating water. Another factor, which has not been sufficiently emphasised by Graebner, is the action of those bacteria which give rise to humus in the absence of air. Want of air no less than impoverishment of the soil plays its part.

Although the book is written for the practical man, Dr. Graebner has included a certain amount of purely scientific matter where it has a bearing on economic problems, but the chapter written by Mr. O. von Benthem is more especially concerned with practical considerations. It is evident that profitable cultivation of heath land requires not only careful and scientific farming, but in some cases success can only be attained by general cooperation of the farmers either as a society or under Government supervision. The preparation of the land for agricultural farming or for tree planting is discussed in detail; as a preliminary deep ploughing is advisable and quite necessary where moor-pan has formed. Moor-pan (Ortstein) is practically a layer of stone, which is formed when percolating water containing humates reaches layers of soil which are rich in mineral salts; the humates are precipitated, and bind the particles of soil into a stratum of stone, which as it thickens cannot be penetrated even by tree roots.

In the latter portion of the book the different formations are considered from the purely botanical standpoint according to the characteristic plants. The problems connected with the cultivation of heaths are complicated but interesting; for this reason the opinions of Dr. Graebner, who has made a careful study of the subject, are the more valuable.

I Nuovi Indirizzi e le Promesse della Odierna Antropologia. By Fabio Frassetto. Pp. 71. (Castello: C. E. S. Lapi, 1905.) Price 3 lire.

THIS little work consists of a series of four lectures which the author delivered as an introduction to his course of anthropology in the 1904-5 session of the University of Bologna, where, after a break of twenty years, he has taken up the work begun by Sergi before his removal to Rome. Appropriately enough, the first lecture of the four deals with Sergi and his principles of skull classification, and sketches very briefly the types and the deductions which Sergi draws from them—Eurasian and Eurafrican forms, and five species of pygmies—at the same time pointing out that many of these views are only provisional. Dr. Frassetto holds that just criteria of race are of the utmost importance, not only for the sociologist, which most inquirers would be prepared to admit, but also for the medical man, who will more readily diagnose the maladies which he has to treat, in proportion as racial morphology and pathology are determined with precision and at the same time it becomes possible to classify the individual patient from an anthropological point of view. If he is too sanguine in this, another point on which Dr. Frassetto insists does not seem beyond the range of practical politics; this is the development of pædagogic anthropology, which shall regulate the education of the individual child by scientific principles. Even here, however, at any rate in our own case, the problem of feeding the child and of providing it with a healthy body will probably